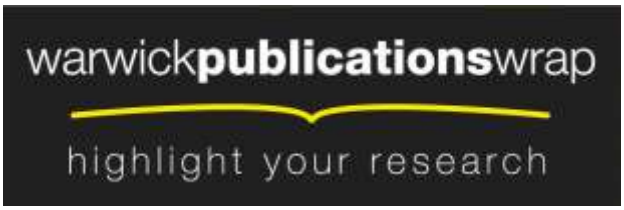

Multilingual mobile learning – A case study of four South African high schools

Mmaki Jantjies
Department of Computer Science
University of Warwick
Coventry, CV4 7AL, UK
M.E.Jantjies@warwick.ac.uk

Mike Joy
Department of Computer Science
University of Warwick
Coventry, CV4 7AL, UK
M.S.Joy@warwick.ac.uk

ABSTRACT
The constraint of inadequate learning material and resources available to learners in some South African schools has motivated continuous attempts by the government and public to improve the education system. Most learners from poor communities rely extensively on learning material received in those schools. Language has also been identified as an obstacle in their education, as most of the South African population are not first language speakers of the instructional language. Switching between two languages (code-switching) to converse is a popular method of communication in South African schools, and this is also attributable to the country's diverse language community. A learner's inability to adequately communicate in English consequently contributes to their poor performance in schools.

The increasing accessibility of mobile phones has influenced their widespread use in various socio-economic communities as the most affordable means of basic communication and technology. This has also increased their potential as a contributory solution to the South African education challenges, as mobile phones afford learners a supplementary learning platform with limited cost implications. This paper examines the support of mobile phones to learners by the delivery of educational resources on mobile devices with bilingual content. In this research project learners were provided with low cost mobile phones and access to curriculum related bilingual learning content. Four South African public schools were subsequently assessed via surveys on the need for a multilingual mobile learning tool that enables learners to access adequate learning material in their language of choice, thus creating a pervasive learning environment.

Keywords
Multilingual, mobile learning, South Africa, high schools, pedagogy

INTRODUCTION

South African high schools are still struggling to produce desirable results in subjects such as mathematics. There are many contributing factors to the situation including a learner's inability to appropriately articulate content in the instructional language, English (Maree et al., 2006). Some of the country's schools still lack basic resources such as libraries and computers (Perumal, 2009).The rapid growth and improvement of mobile technology has yielded positive results for the delivery of educational materials, and previous research illustrates the use of wireless platforms as potential delivery methods for educational material (El-Hussein & Cronje, 2010). Mobile learning is an appropriate classification for this form of learning as "the provision of education and training on PDAs/palmtops/handhelds, smartphones and mobile phones" (Traxler, 2009:2). One of the most significant benefits of this paradigm is the support it has for ubiquitous and flexible platforms of education for learners in various learning environments (Peng et al., 2009), and mobile learning has made gradual progress as a potential learning paradigm in South African communities in areas where there are limited educational resources (Botha et al., 2008; Brown, 2008; Vosloo & Botha 2009). Mobile learning ideally permits learning which is not restricted by location and time, and it would be appropriate if the same flexibility was to be extended to the availability of learning material in more than one language (de Jong et al., 2010).

This paper explores the need for a multilingual mobile learning support in a community of four schools in South Africa. The main research question of the paper is: *How can bilingual mobile learning be used to support learners in South African schools?* Learners who participated in this research were introduced to a bilingual mobile learning tool that supports their learning process, and each element of the tool could be viewed in two South African languages, namely Setswana and English. The tool focused on supporting learners in mathematics. Whilst using the tool, learners' choice of language when accessing the content was monitored, and through a survey the learners communicated their experiences on the tool and their perspectives on multilingual mobile learning.

LITERATURE BACKGROUND

The relationship between education and language in South Africa

The legacy of the past education system in South Africa has led to problems that still affect the current education system. Resources that are considered as basic in schools elsewhere are still absent in many schools, and include adequate classrooms, libraries, computing or science laboratories and adequately skilled teachers (Perumal, 2009). One of the

fundamental issues that are often overlooked as contributing to learners' poor performances is the use of language in schools, with many learners being unable to appropriately interpret and respond to tasks in English (de Wet & Wolhuter, 2009). In some rural schools, teachers conduct lessons in the commonly spoken community languages and then deliver the class notes in English, but learners often tend to find difficulties in expressing themselves in English. This situation may differ with each school's location, as in urban schools English communication is often entrusted to learners at a young age, therefore their communication and expressions should be more clear and understandable (Brock-Utne, 2007).

Moschkovich (2007), Setati and Adler (2000) investigated the reasons behind the use of more than one language by bilingual learners to solve mathematics tasks, and their research reflects existing occurrences of code-switching in mathematics lessons. They found that learners would interpret a task in their primary communication language especially if it was challenging. The learner would then attempt to communicate this using the instructional language, and this helped them better to understand what was required from them.

THE RESEARCH METHOD

A total of 90 learners aged between 16 and 18 years from four different public schools participated in the research project. The schools consisted of one located in an urban area, two located in rural areas and the final school located in a township. The participating learners were all studying mathematics in grades 11 and 12, the latter being the final year of high school in the South African educational system. Ethical issues were considered with a request submitted to the presiding department of the school to conduct research. As mobile phones are not allowed on school grounds, the learners were permitted to use mobile phones in school only for the purpose of this research, and each learner was provided with a mobile phone equipped with basic WAP features providing access to a mathematics application. The application consisted of learning material from various sources including teachers and a subject advisor from the North West department of education. Learners were given an opportunity to access a learning application with content available to view in two South African languages, Setswana and English. The content focused on supporting learners in the area of simultaneous equations, and was created to support learners between grades 10 and 12. The application had four sections of study comprising, simplified notes collaboratively created by teachers, notes from their text books, an interactive drill question and answer section, and a test in the learning area. The learners seemed to appreciate the drill section as they enjoyed receiving responses on their performance and how they could best achieve a solution. The learners went through each section at their own pace. Each page of content had an option to be viewed in either Setswana or English.

After interacting with a mathematics bilingual learning tool, learners completed self-administered questionnaires in the presence of an interviewer. The choice to be present whilst the learners filled in the questionnaires allowed the interviewer to clarify their understanding of the questions (Cohen et al., 2011). Some learners and teachers were interviewed through semi- structured interviews. This data collection process took place over a period of a month. The data were analysed through themes. Unlike other data analysis strategies, thematic analysis focuses on what the research participant's responses were as opposed to particularly focusing on how the participants responded (Bryman, 2004). Pseudonyms have been used to protect the identities of the participants.

DATA COLLECTED

Adequate learning resources

The participating learners from these three schools (schools B, C and D) depended highly on the learning content provided by the teachers as they could not afford to access more information elsewhere, while learners from school A had access to different channels of gaining further learning resources. Most of the participating learners had no knowledge of online or mobile phone based games and learning resources, and mostly came from families that had financial difficulties and could not afford to financially support their education. While 56% of the participating learners mentioned that they were at times expected to use technology to do their homework or assignments by researching on the Internet or typing out their homework, only 22% of these learners had access to a computer within the school grounds. Despite this, 48% of all learners owned a mobile phone with the remaining percentage of learners having access to mobile phones.

Language use in schools and in communities

Learners from school A also live in areas where English is the secondary popular language after the area's indigenous languages. During the research, it was found that they were able to easily articulate themselves, both verbally and in writing using the English language. Learners from schools B, C and D live in areas where their home languages are commonly spoken as the primary languages with minimal use of English in their communities. In contrast to learners in school A, some learners from these schools struggled to clearly articulate their opinions, especially when filling in the research questionnaires.

None of the participating learners had English as their first language, and learners from schools B, C, and D only acquired the skill to effectively read and write in English when they started school. Each participating learner was able to read, write and communicate in at least two South African languages including English. A total of 63% of the learners stated that they tend to code-switch between English and Setswana when asking questions during class. The code-switching occurred only verbally and not in writing. Despite the good English foundation that learners from school A possessed, most of the participating learners found that code-switching assisted them to effectively articulate their views

and give answers in class. Teachers from schools A, C and D used both of these languages while teaching in order to assist learners to effectively understand what they taught. The teacher in school B was from a foreign country and primarily used English to teach as she could not communicate in other South African languages. There are different language learning books published in most of the indigenous South African languages but there are no available published books that support the teaching and learning of other subjects (i.e. mathematics, physical science) through indigenous South African languages (Setati, 2008). Learners commented on the limited availability of online learning material and resources published in indigenous languages.

Bilingual mobile learning experiences

Learners were provided with mobile phones that allowed them to access the Internet, and some of the learners used their personal mobile phones during the research project. They were given an opportunity to access and effectively interact with a mobile learning application. The application focused on mathematics (simultaneous equations), with the content available to view in both Setswana and English. The content was primarily developed to support learners in grades 10–12 providing them with resources that supported all their learning areas. The learners were able to study the subject area and also test their skills on the subject area through the application.

In the participating schools only one of the teachers, from school B, was aware of online and offline mobile learning games and the remaining teachers had no knowledge of such applications. Despite this, two of the teachers supported the learners when they raised questions related to the tasks in the content of the application and assisted them in solving some of the tasks. From interacting with the content, 61% of the learners said that they used both languages to read the content on the application. Collectively, 34% of them used only English to view the mobile content, but 98% of the learners cited the need for mobile content that supported their current studies. Although the research project was a pilot project, both learners and teachers urged the need for an extension of the project so that it could continue to support the learners. The schools situated in the urban areas (schools A and B) had the highest number of learners reading content using only the English language with 53.8% and 26.9% respectively. The school (C) with the highest number of learners reading content in both Setswana and English with 52.4% was based in a rural village. None of the learners read the content using only the Setswana language.

DISCUSSION

The information above suggests that learners still face a shortage of and a need for adequate learning material. Despite having access to learning resources, learners in school A (urban area) felt that learners need pervasive learning material to learn as and when they felt a need. For the learners in schools B, C and D, mobile learning provided a resource to support their needs. Learners especially in rural schools are still in need of supplementary learning material which they would not need to spend extra money to obtain, and this problem is more prevalent in schools situated in lower income areas. The availability of additional resources enhances the performance of learners (Legotlo et al., 2002). With most adults in rural communities either unemployed or employed as domestic workers, gardeners and other low-income related jobs, the learners' parents often struggle to provide them with basic necessities of life. Activities or resources in schools that require them to financially spend on their education become difficult for these communities to support. Furthermore the schools which they attend offer limited resources with a common shortage of teachers in key learning areas such as mathematics and science. The teachers are also faced with high ratios of learners and limited teaching resources including prescribed books per learner (DOBE, 2011). Rural based schools are often far from the main cities limiting learners on access to public libraries or Internet and computing centres. With the abundant availability of mobile phones in South African communities (Vosloo & Botha, 2009), mobile learning provides a suitable platform to bridge the existing resource divide amongst learners. Learners in these areas are often less exposed to opportunities that could support them throughout their learning process.

Language is a current challenge in the South African education system. The participating learners found it easier to mix languages when learning and to also communicate amongst themselves in the formal class settings regardless of their language background. Bilingual learning is a common factor in these schools. Prior language acquisition also affects the understanding of a learner when interpreting content. Technical aspects of the language need to be clearly understood by a learner beforehand in order for them to adequately understand and respond appropriately to their tasks in class. This problem seems to be prevalent in mathematics classrooms. Mathematics needs to be clearly communicated through language in order for the learner to clearly understand what is required of them and to consequently respond appropriately (Botes & Mji, 2010; Setati, 2008). Some of the factors leading to poor language acquisition include the learner's "lack of English reading material at home and at school; and poor language teaching by teachers whose own English proficiency is limited" (Nel & Muller, 2010: 636). There is also a lack of learning material available in most South African languages for secondary school mathematics lessons (Setati, 2008). The classrooms are thus characterised by learners and teachers who cannot communicate adequately in English and do not have sufficient access to learning material available in their home languages and the instructional language.

CONCLUSION

Many researchers have outlined the potential use of mobile phones as learning resources. Having learning content available on mobile phones increases the ease of access to learning material for learners in different communities. From

the research results, there is a clear limitation on the amount of learning resources that are available in multiple South African languages. With educational policies and dialogue supporting the need for multi-language classrooms there is a need for learning material that will support this. The permutation of mobile learning and multilingual content needs to be further explored to improve the current state of education and language use in South African schools and afford learners ubiquitous learning content in their preferred language of choice.

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